SESSION 2.5

NextPhase

Intersection Management Software

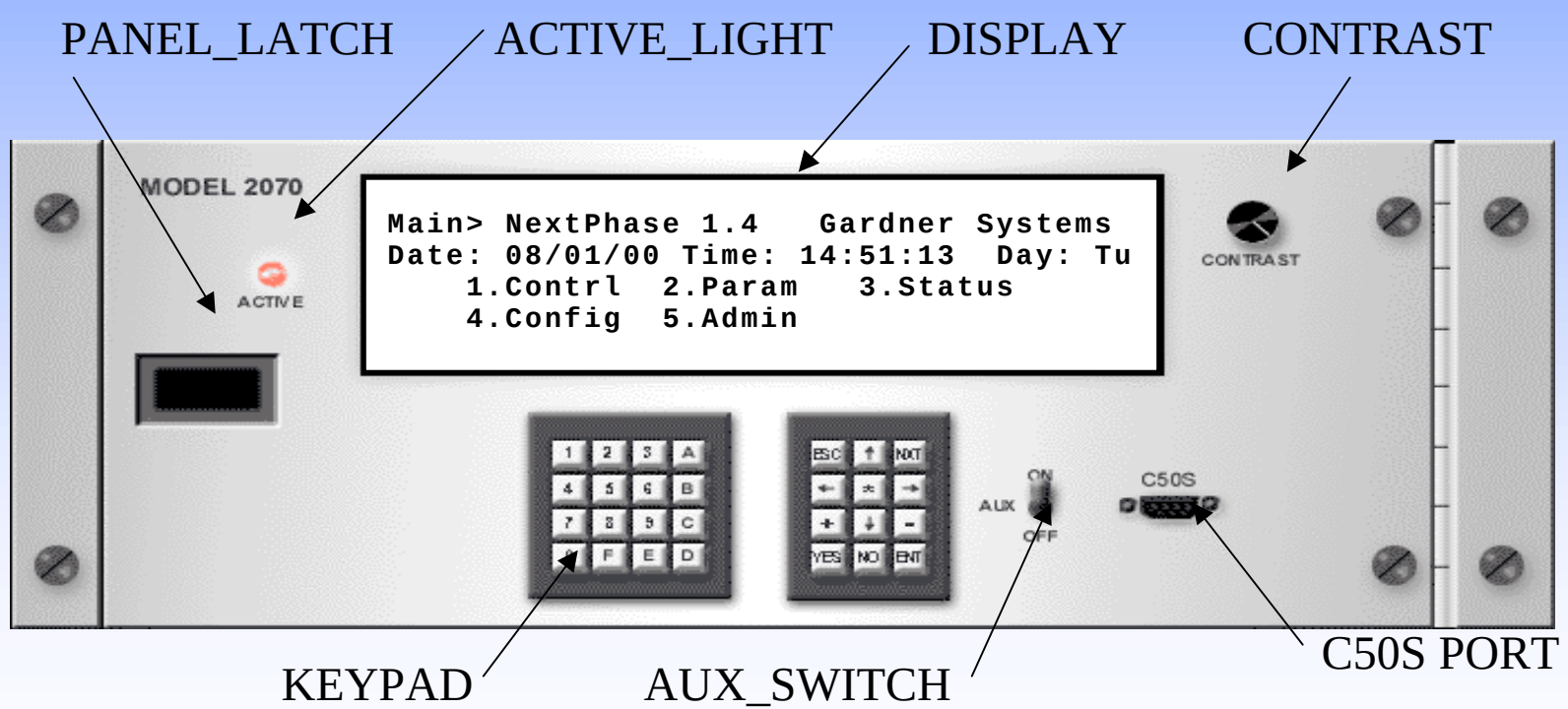
Craig Gardner

2070 Hardware Features

- **Model 2070 Hardware**
  - 32-Bit Processor with Real-Time Operating System
  - 4 or 8-Line by 40 Character Display Grid
  - Up to 4 External Communications Ports Available
  - Supports Multiple Cabinets -> 170, TS1, TS2, ITS
  - Modular Design Allows Different Configurations
    - Chassis, Power Supply, VME Expansion Cage, CPU Board, Front Panel, Field I/O & Communications Modules

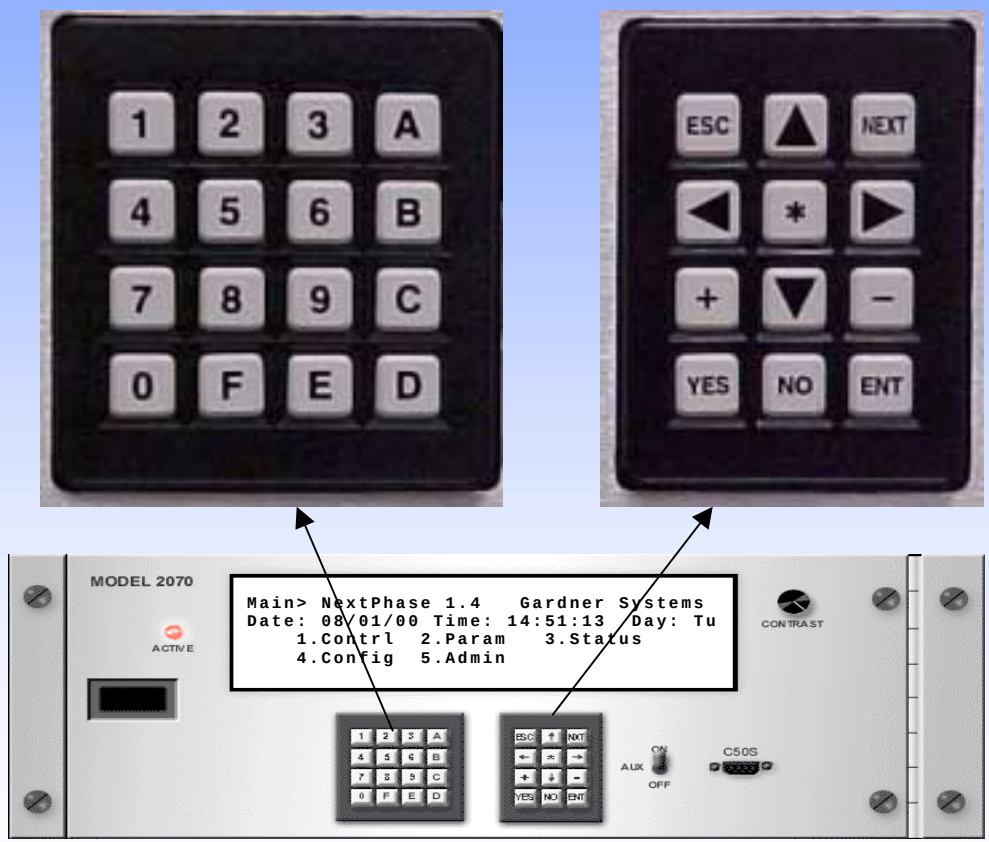
2070 Controls

- **The Model 2070 Controller Front Panel**



2070 Controls

The Model 2070 Controller Keypads



NextPhase Overview

- **Designed for ATC's such as the Model 2070**
- **C++ Reliability and Expansion (Source Avail.)**
- **Easy to use, Menu-Driven Interface**
- **Advanced Communications (NTCIP)**
- **Cooperate Multitasking (standard API)**
- **Extendable Features such as Adaptive Control or Transit Priority**

Capabilities of *NextPhase*

- **Standard Software Capabilities**
  - 40 Phases / 20 Overlaps
  - 20 Rings / 26 Barriers
    - Rings can Operate Independently or in Groups
  - Overlaps Configurable like Phases
    - Minimum Green
    - Actuated / Extension
    - Pedestrian Timings
  - 64 Vehicle / Pedestrian Detectors
  - Smart Menu System (shows configured only)
  - Standard Configuration Templates

Capabilities of *NextPhase*

- **Optional Software**
  - Traffic Adaptive Control (RHODES)
  - NTCIP Communications (ASC Objects)
  - CMS Control (NTCIP Translator)
  - CCTV (NTCIP Translator)
  - Ramp Metering
  - Reversible Lane & Gate Control

Capabilities of *NextPhase*

- **System Coordination**
  - **250 Coordination Plans Supported**
    - Coordinated, Adaptive, Free, Programmed Flash
    - Multiple Offset Values & Reference Points Available
  - **Multiple Transitioning Modes**
    - Hold, Dwell, Long Way, Short Way, Best Way
    - Minimum & Maximum Split Timings per Plan
  - **Internal and/or External Coordination Control**
    - Various Plan Selection Modes Available
    - Manual, TOD Schedules, or Remote Commands

Capabilities of *NextPhase*

- **User Interface**
  - Menu Driven Displays
  - Config. Based Data Filtering
  - Login and Passwords (Optional)
    - Multiple Access Levels
    - Automatic Logout Configurable
  - Configurable Preferences
    - Backlight
    - Key Repeat & Scrolling
  - Shortcut Keys for Bitfield Data (Flags)

Capabilities of *NextPhase*

- **Support of Multiple Cabinet Types**
  - Model 170
  - NEMA Controllers
    - NEMA TS1
    - NEMA TS2 - Type 1
  - Fully Configurable
  - 128 Input Channels
  - 128 Output Channels

Capabilities of *NextPhase*

- **External Communications**
  - Multiple Ports Configurable
  - Extended AB-3418 Protocol Support
  - NTCIP Comm. (Optional)
  - Wireless – Event Driven
  - Remote PC-Based Graphical Database Editor (Upload / Download Capabilities)
  - “NextWeb” Palm Device Interface

Capabilities of *NextPhase*

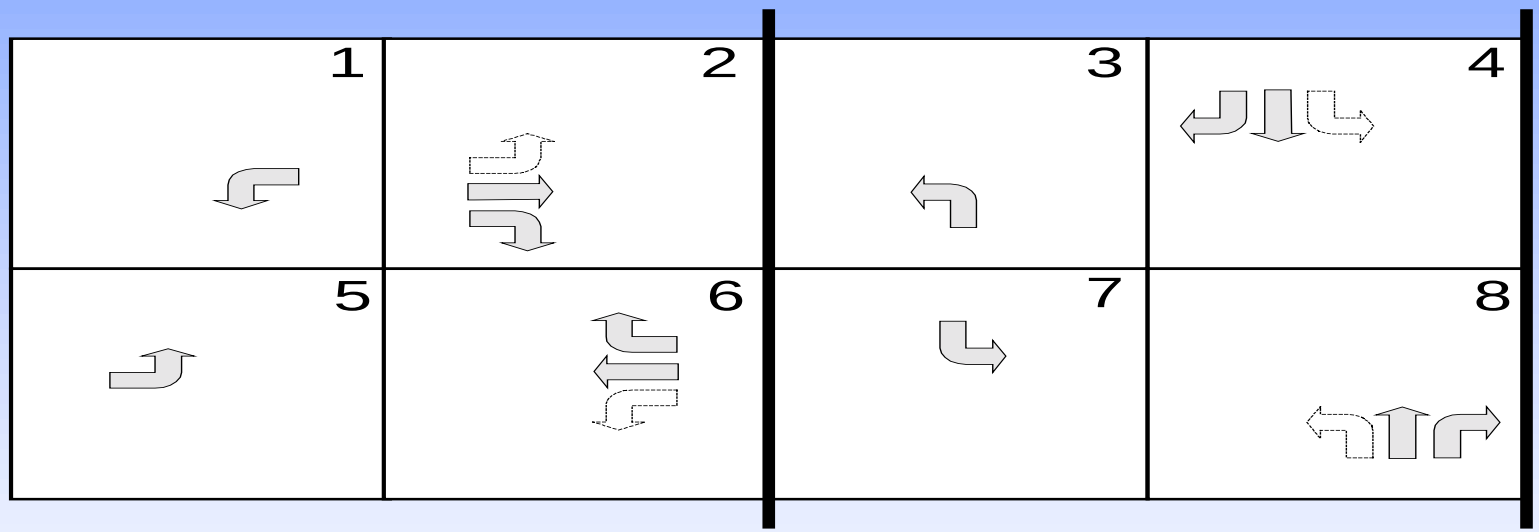
- ***NextPhase* Database**
  - Multiple Tables
    - 250 Plan-Related Data Tables
    - 10 Instances Supported for most Configuration Tables
  - Fail-Safe Checks and Back-ups
    - Automatic File Integrity Checks
    - Parameter Tables can be Backed-up or Restored
    - Corrupted Tables Automatically Restored from Backup
    - Changeable Range Limits (Yellow Clearance, Etc)

The Menu Structure

- **The Main Menu**
  - Submenu Options
    - Control [Control] -> Modify the Active Control Settings
    - Parameters [Param] -> Typical Day-to-Day Operations
    - Status [Status] -> Monitor Active Status Information
    - Configuration [Config] -> Initialization Information
    - Administration [Admin] -> Access and Interfacing

Ring Phase Configuration

- **Phase Rings Submenu (Dual-Ring Structure)**




```
PhsCfg 1> Ring Configuration
R1   1,2,a,3,4,b
R2   5,6,a,7,8,b
R3
```

“RHODES” Adaptive Control

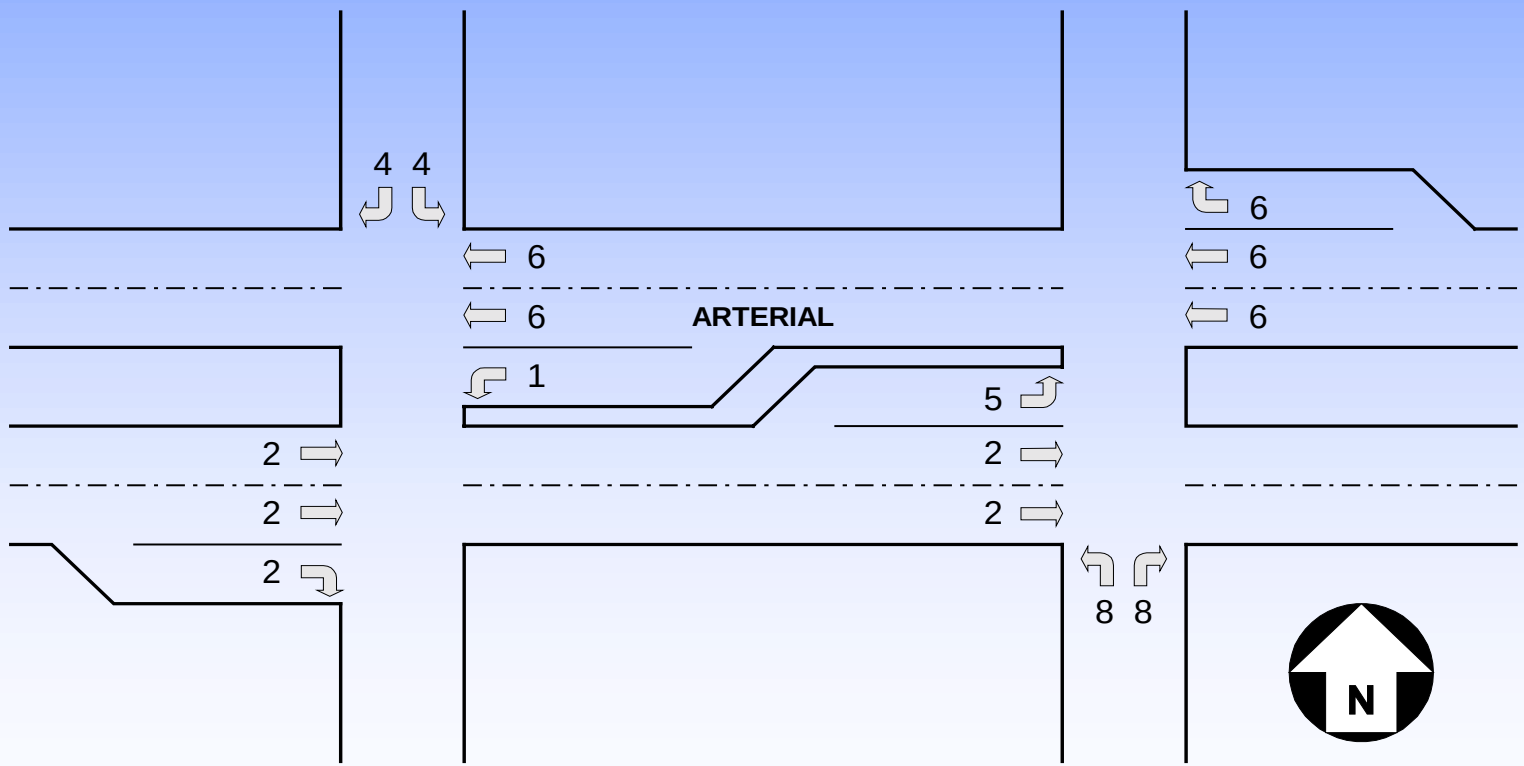
- **Adaptive Control Status**
  - Status Display
    - Plan [Plan] -> Indicates the Active *NextPhase* Plan
    - Mode [Mode] -> Shows the Requested Operating Mode
    - State [State] -> Shows Current Adaptive Operating Mode
    - Control Ready [OnLineRdy] -> Seconds Before On-Line
    - Peer Fail [PeerFail] -> Shows the Peer Message Status
      - Blank ( ) -> Not Configured
      - Dot (.) -> Peer Message Good
      - Bad (X) -> Peer Message Failure
    - Optional Feature Available in *NextPhase*

Adaptive Queue

- **Adaptive Queue Status**
  - Status Display Definitions
    - Screen Displays all the Queue Estimates used by the Optional Adaptive Control Module
    - Each Heading Represents a Specific Traffic Movement and the Associated Queue Length

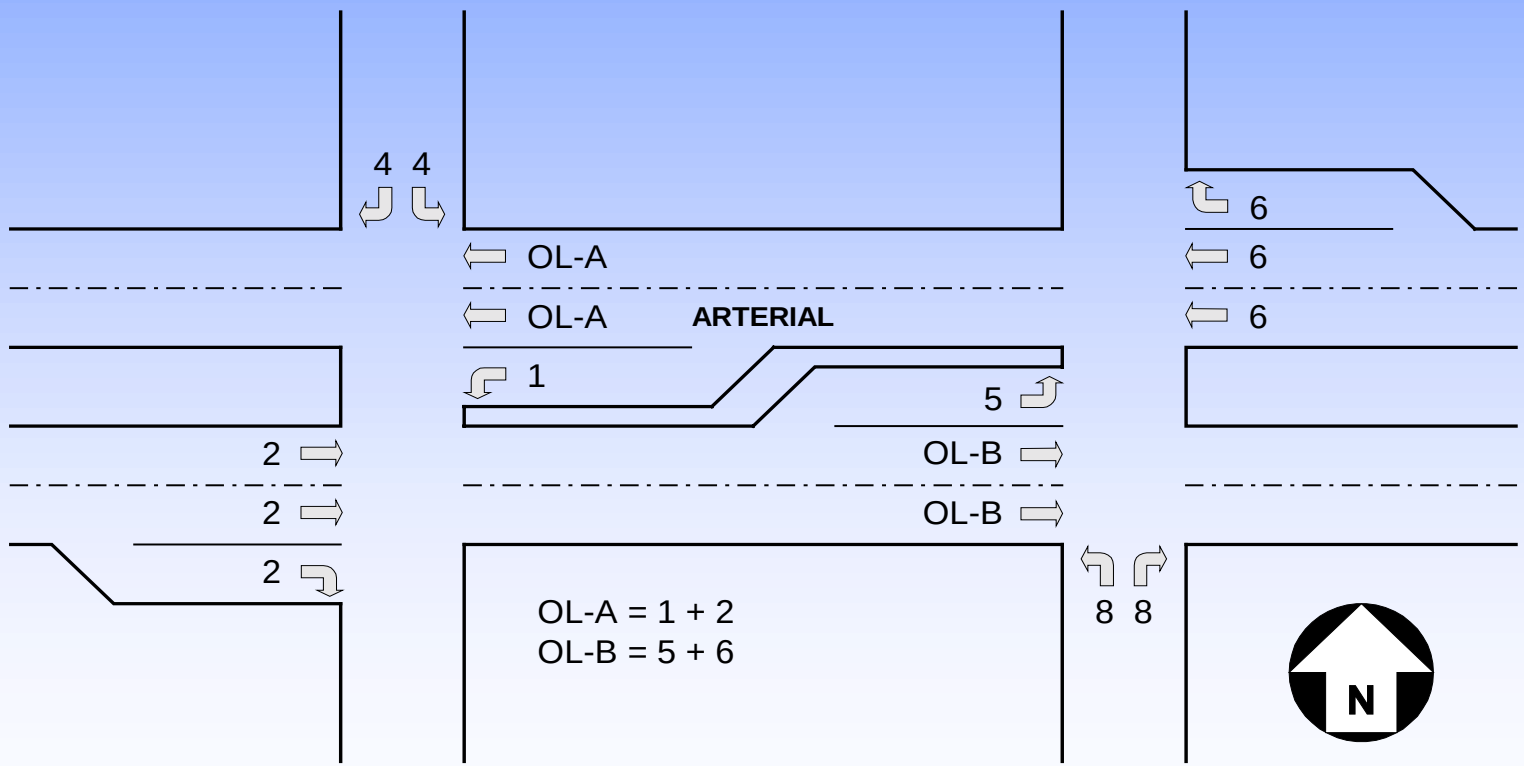
Examples / Diamonds

- **Diamond Interchange (Separate 3-Phase)**



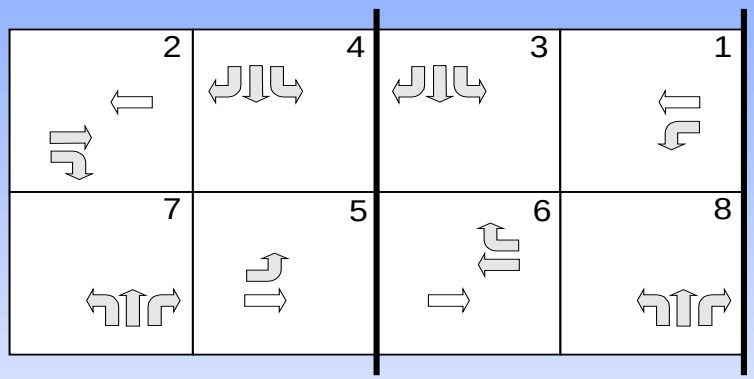
Examples / Diamonds

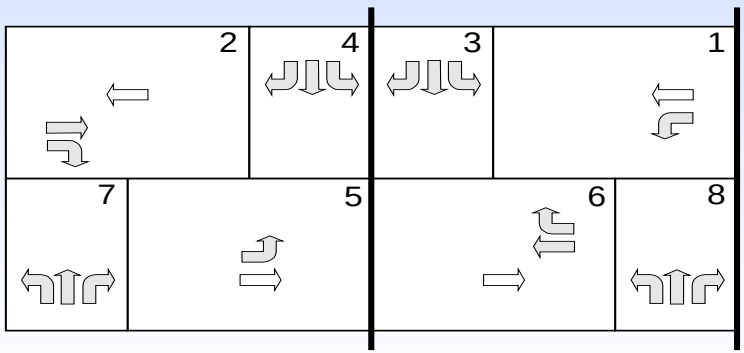
- **Diamond Interchange (Single 3-Phase)**

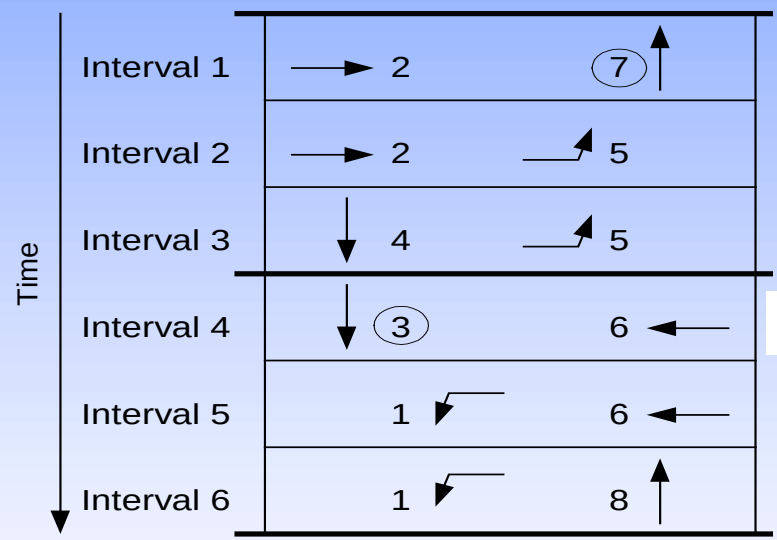


Examples / Diamonds (Rings)

- **Diamond Interchange (Single 4-Phase)**



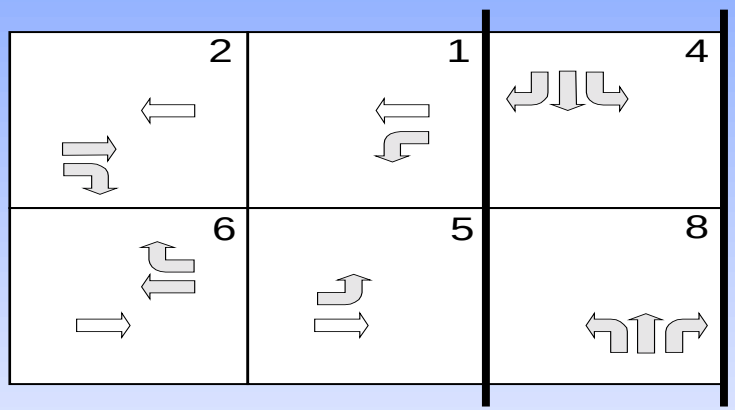


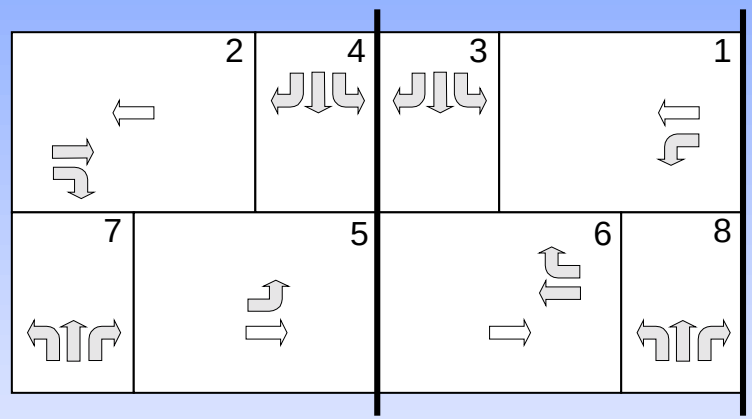


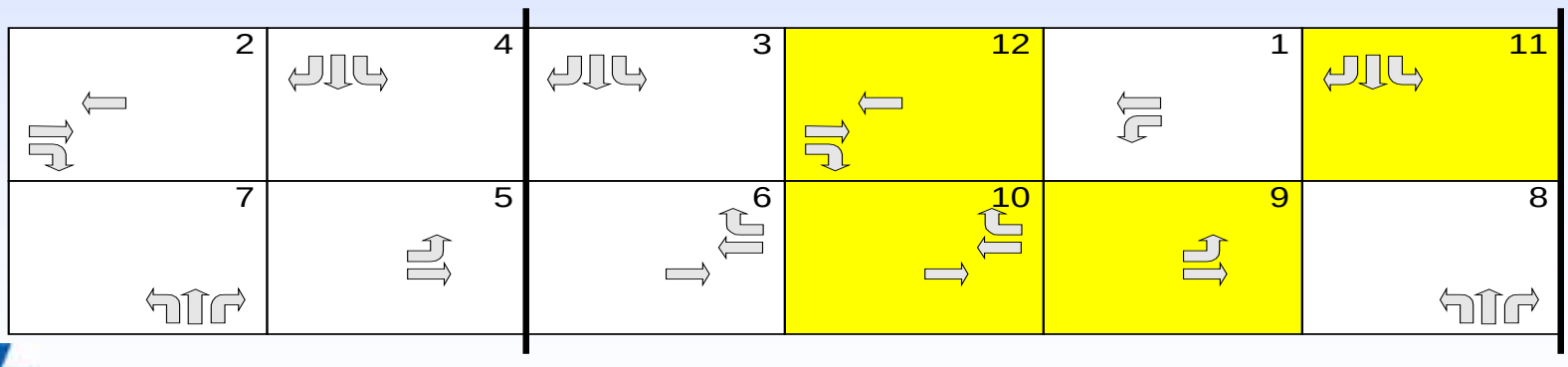

```
PhsCfg 1>  Ring Configuration
R1  2,4,a,3,1,b
R2  7,5,a,6,8,b
R3
```

Examples / Diamonds (Rings)

- **The Power of *NextPhase* (3 & 4-Phase)**

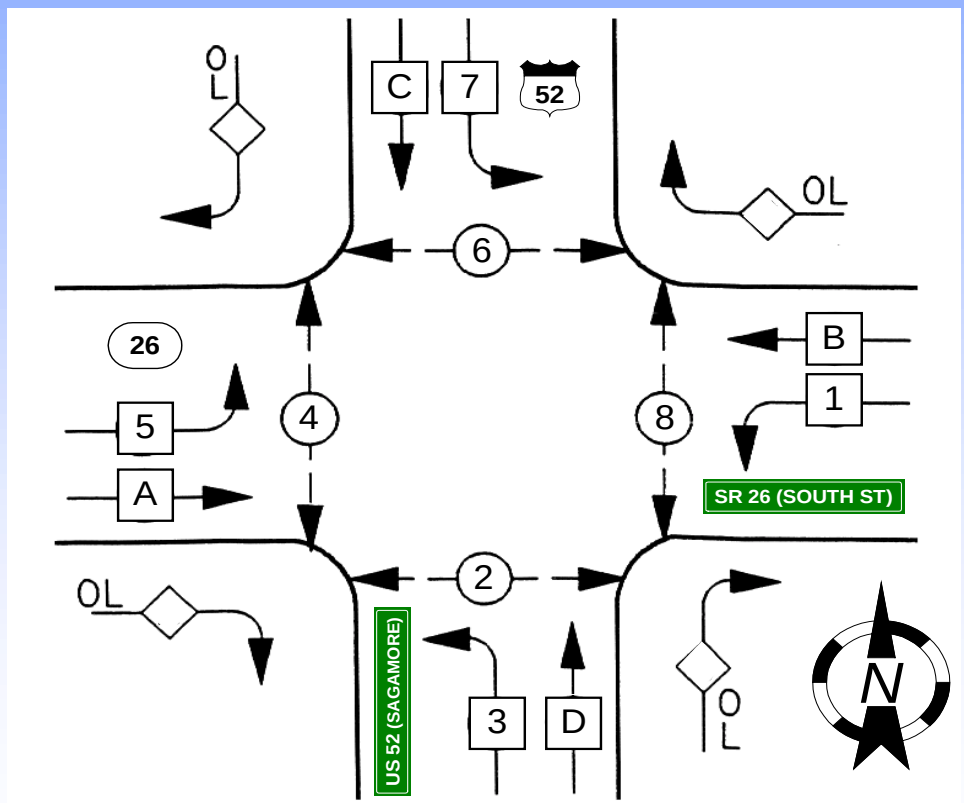


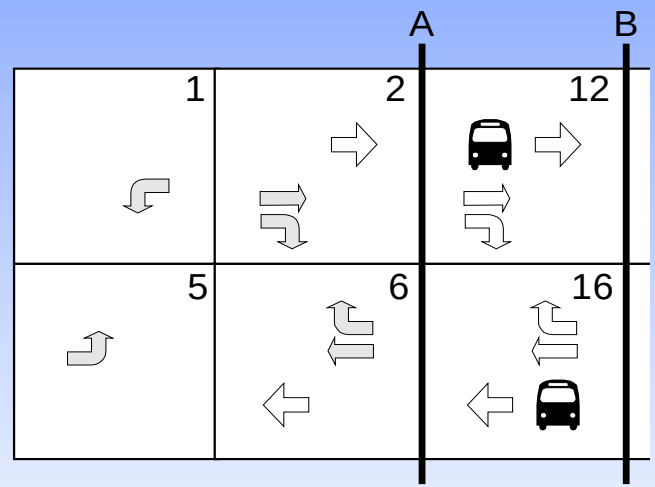




Examples / Bus Priority

- **Bus Priority Demonstration (With Priority)**

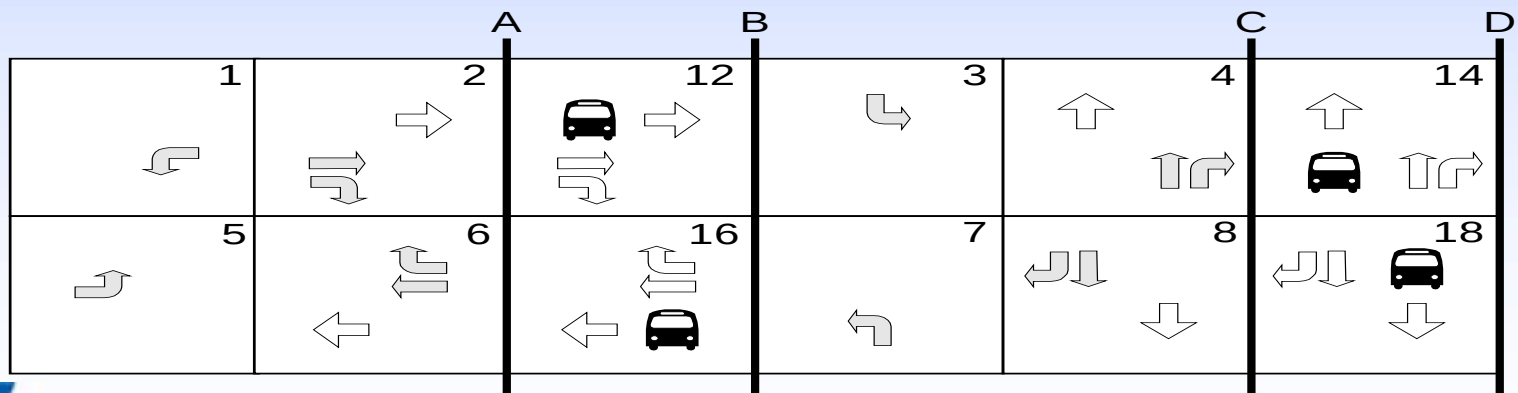





```
PhsCfg 1>  Ring Configuration
R1   1,2,a,12,b,3,4,c,14,d
R2   5,6,a,16,b,7,8,c,18,d
R3   22,26,32
```

Examples / Bus Priority

- **Control of Slack Time Allocation after Hold Phases – Maximum Green While Coordinated**
  - Typically used when Phases are Omitted Periodically
  - Both Bus and Transit Priority are Practical Examples
  - Particularly Helpful for Fixed-Time Operation (Max Recall)



Bus & LRT Transit Priority

- Any number of transit movements
- Early green, extended green, inserted green
- Multiple opportunities in cycle when needed
- Any number of advance detectors
- Delay any action after detection
- Queue jump phases if needed
- No offset transitions – stays in step
- Lock out period after priority if desired
- Free, coordinated, phase sequence by TOD
- LRT reverse running if needed
- Activate “Trolley Coming” signs

Overview of Overlaps

- ***NextPhase* Overlap Functionality**
  - Overlaps Operative Similar to Phases
    - Contains Minimum and Maximum Green Times
    - Has its own Red, Yellow, and Green Clearance Times
    - Compatible Pedestrian Timing with Some Overlap Types
  - Other Advanced Overlap Features
    - Ability to Terminate Overlaps (with Input) just as Phases
    - An Optional Reservice Timer that Control Reservice Time
    - Option of using Phase Clearances or Overlap Clearances

NextPhase Summary

- Smart User Interface
- 40 phases
- 20 rings
- 26 barriers
- 20 overlaps
- 10 preempts
- Mapped I/O
- 250 plans

- Simple Setup w/ Templates
- Ped overlaps
- Multiple signals
- “Free” coordination
- Repeated phases
- Unequal double cycling
- Transit Priority
- Complex Intersections